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ABSTRACT

The returns on continuing vocational training (CVT) in enterprises were examined through a review of research on the returns on employer-provided training. A search of "Econ Lit," ERIC, and other databases identified more than 90 publications on the topic. Twenty-one publications examining the relationship between training inputs and training outputs from a variety of perspectives were selected for in-depth analysis. The following were among the review's main conclusions: strict rates of return have rarely been calculated; training is shown to have positive effects on wages and productivity; evidence suggests that training received from one employer increases productivity and wages with another employer; and selection effects matter in training. The studies were also analyzed from the standpoint of the issues involved in measuring the returns to CVT investments. The amount of empirical research concerned with estimating returns to CVT was discovered to be relatively sparse and underdeveloped. It was recommended that more thought be given to methodological issues, such as the suitability of qualitative and quantitative research and whether they can complement one another. (The 21 studies are summarized in an annotated bibliography. The document contains 93 references.) (MN)

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CEDEFOP

European Centre for the Development of Vocational Training

Exploring the returns to continuing vocational training in enterprises

A review of research within and outside of the European Union

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Foreword by Sarah Elson-Rogers

This report contains a review of research undertaken within and beyond the European Union to identify and measure the returns to continuing vocational training (CVT) in enterprises. The report is not written as an end in itself, but rather as an input to a longer term CEDEFOP project to undertake further research in this area. Increasing investment in enterprise CVT is one aspect of achieving the notion of 'lifelong learning for all', but the general lack of information as to the returns of such training for the state, sectors, enterprises, and individuals means that there are a number of difficulties in evaluating current and future investment decisions. This information 'gap' is not easy to fill, partly due to insufficient methodological tools and data, but also due to certain conceptual constraints: for example, defining CVT, given that it is a generic term encompassing a number of different training activities.

The aim of this *review* is, therefore, to discuss a number of these difficulties and summarise how existing studies have approached them as a means to assess how existing work might be developed or supplemented. While the original parameters for this review were wide, the scope of the existing research turned out to be narrower than initially expected; hence as a *review* the report concentrates on available work, much of which has been done in the U.S. It is worth noting that many of the studies are very recent (post 1990), which indicates a growing interest and ability to explore the returns to enterprise CVT.

Alan Barrett, an economist from the Economic and Social Research Institute (ESRI) in Ireland, and Ben Hövels, a sociologist from the Instituut voor Toegepaste Sociale Wetenschappen (ITS) in the Netherlands prepared this report as a preliminary stage in which it is intended to stimulate debate on how additional research in this area could best be undertaken. The disciplinary mix of the participants ensured that a broad range of research was included.

In order that this report represent a true discussion document, CEDEFOP would be very interested in hearing other views concerning existing or future research projects into the

returns to enterprise CVT. In addition, we would welcome your views on this report and your suggestions for future work. For this reason, a questionnaire accompanies this report as a means to gain additional insights and ideas from a number of other sources. On this basis, participation in this work could be extended so as to formulate and execute a research project.

If you would like a copy of this questionnaire, please do not hesitate to contact:

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The deadline for comments is the end of November 1998.

We would like to thank you for giving this first report your attention and look forward to receiving your comments and suggestions in the near future.

Sarah Elson-Rogers/Sven-Åge Westphalen
Project co-ordinators

Stavros Stavrou
Deputy Director, CEDEFOP

Table of Contents

Section 1: Introduction **1**

1.1 *Background* *1*
1.2 *Research to date* *2*
1.3 *Methodology for this review* *3*

Section 2: Description of the studies **5**

2.1 *The studies* *5*
2.2 *Conclusions* *20*

Section 3: Some central issues - an overview and discussion **25**

3.1 *Evaluating CVT returns at the enterprise level* *25*
3.2 *Levels of evaluation* *27*
3.3 *Types/forms of training* *29*
3.4 *Types of returns* *31*
3.5 *Who receives the returns* *33*
3.6 *Methodologies* *37*

Section 4: Conclusions and further work **41**

4.1 *Conclusions* *41*
4.2 *Further work* *44*

Section 5: References **47**

SECTION 1: Introduction

1.1 Background

This review presents research which has attempted to estimate the returns to employer-provided training, discusses the conceptual and methodological issues which have arisen in this context, and suggests ways in which research in this area can be usefully expanded. Before getting into the detail of the review, it is important to explain why these are important issues and why additional research effort should be employed.

In a world of growing international competition and accelerating technological change, firms face a variety of pressures and challenges related to training. Competition requires that costs be contained; all areas of possible containment, including training, must be assessed. Competition also requires, however, that the workforce of each firm be as productive as possible, thus creating a need for increased training expenditure; technological change generates similar pressures. It is this tension between the reasons for increasing and reducing training at the level of the firm that produces the need for a rigorous understanding of the returns to training. Without reliable information on the relationship between the costs and benefits of training, decisions on the financing of training must be made on the basis of hunches and impressions. In such a setting, the potential for the misallocation of resources to training is large, for example, through insufficient investment in training or through excessive spending on certain types of training.

In a similar manner, competitive pressures have required those within firms who are responsible for training to prove the benefits of training in terms of the effect on the "bottom line". Just as firms increasingly buy in services rather than provide them from within, there are growing pressures to hire in employees with the required skills, even for very short periods, as opposed to training existing staff and providing them with the skills. As a result, the nature of the employment relationship is changing with an increase in, for example, short-term contracts. In such a situation, the long-term goals of employers and employees may differ given that it is less likely that they will have a long-term

relationship. Employees who are transitory will want their training to be general in nature so that they can transfer it easily. The work of Becker (1975) reviewed below indicates that this makes it more likely that firms will not finance training; hence, the burden is more likely to fall on employees themselves or the state.

While the need for estimating the returns to training may seem clear, the question can still be asked as to why such estimation should not be left to individual companies. Alternatively, why is it important for social science researchers to explore this issue? There are a number of dimensions to the answer. If firms feel under pressure to economise on their training expenditure, they are even more likely to face such pressures in relation to devoting resources to training evaluation. Hence firms may not undertake the evaluations[1]. But even if they do, independent social scientists still have a role. First, it is rare that individual companies publish evaluation results, so any information generated tends not to be disseminated. Second, and more importantly, evaluations done by individual firms will yield results which are specific to the firm itself. It requires the social scientist's expertise to generate results which are more generally applicable through the use of standardised techniques in the study of a larger range of companies.

1.2 Research to date

It is only in recent years that researchers have begun to make attempts at measuring the returns to employer-provided training. Although they have been estimating the returns to more formal schooling for many years, returns to employer-provided training were thought to be captured by estimating the link between work experience and wage growth. Just as wages were seen to be higher for individuals with more schooling, so also were wages seen to be higher for individuals with more work experience and longer tenure in a particular job. The interpretation put on this finding was that workers receive training in jobs and become more productive over time. By looking at how wages rose with experience and making assumptions on the costs of training, rates of return could be estimated.

[1] This point is returned to in Section 3.1 below.

The assumed link between the earnings-experience profile and training came to be questioned in the 1970s and 1980s from both theoretical and empirical perspectives. One theoretical question was raised by Lazear (1979). He argues that wages rise with experience because employers want to provide workers with an incentive to remain with the firm; if higher wages are postponed to later in the worker's career, the worker will be induced to remain with the employer. If this is true, then wages are not necessarily linked with experience and productivity, as is implied by the training argument. On the empirical front, the paper by Medoff and Abraham (1981) raised further questions about the link between experience and productivity. Drawing on the personnel files of a large firm, they were able to demonstrate that although more experienced workers were paid more, they were no more productive.

Given the questions that had been raised by these authors and others, it was clear that an important avenue of research was the direct estimation of the benefits of training. As will be seen below, the lines of enquiry followed have included estimating the link between training and wages (as opposed to experience and wages), the link between training and productivity, and the effects of training on other variables such as reducing the incidence of unemployment and increasing job satisfaction. Studies have also begun to differentiate between different forms of training, for example, off-the-job and on-the-job.

1.3 Methodology for this review

As with all research in the social sciences, the studies whose quality has been validated through peer-review can be found in scientific journals, and so it was primarily to these journals that we turned in looking for research on the topic. We have, however, also drawn on working papers which allow us to consider the most recent work. In searching for studies we began by looking through the relevant records in the CD-ROM version of *Econ Lit*, which is the most comprehensive reference collection for journal articles and books in economics, and through relevant data-files such as ERIC. We also consulted colleagues who provided other references, in particular references to studies as yet

unpublished. Finally, we studied recent reviews which touched on the issues of interest here.

It should be noted that at the outset of the literature search, the definition of 'returns' being employed was wide, i.e. we were looking at the returns to enterprise training for individuals, the enterprise and the state on the assumption that this incorporated both training effects and training effectiveness. It can be seen that many of the studies reviewed below have looked at returns only in terms of the 'effects' of training on productivity and wage growth rather than the effectiveness of the training process itself, and the review reflects this.

It should also be noted that this review, due to a lack of information, does not address in a detailed way the issue of whether returns differ according to who funds employer-provided training. We know that in some countries enterprise training receives a high level of state subsidy, while in others, individuals are expected to co-invest in training with the enterprise. At this stage, we are merely concerned with studies which have attempted to establish a causal link between the provision of training within the enterprise and a 'return', as a means to assess who should fund training.

The content and structure of this review has therefore been determined to a large degree by the content of the studies included, the scope of which turned out to be narrower than expected. As mentioned, we had intended to include studies which looked at returns to individuals, firms and the state. The state perspective, however, is particularly underdeveloped, and the review reflects this by focusing its discussion on the returns for the enterprise and the individual. While the impact of education on growth rates across countries has been addressed in the economics literature, very little work has been done on employer-provided CVT. This in itself is an interesting finding.

SECTION 2: Description of the studies

In the first part of this section, we present outlines of a range of studies which have looked at the relationship between training inputs and training outputs from a variety of perspectives. Rather than arranging the studies into categories, we have decided to present the studies initially in a chronological fashion. In the second part of the section, we will draw out the conclusions of the studies, and at this point a categorisation of sorts will emerge.

2.1 The studies

Booth, Alison L. (1991), "Job-Related Formal Training: Who Receives It and What is It Worth?", *Oxford Bulletin of Economics and Statistics*, Vol. 53, No. 3, pp. 281-294.

As the title suggests, Booth's interest was in establishing who received training and, more importantly for current purposes, what the wage gain was for those who trained. The usefulness of drawing on a large-scale survey of individuals to explore the relationship between training inputs and outputs is seen in the study. Booth's data comes from the British Social Attitudes Survey of 1987. This is a representative sample of the entire population; however, only employees from this sample are included in the analysis, leaving 1,365 individuals. The individuals in the survey are asked to provide information on the amount of training they have received. However, the data used by Booth contain a weakness. Training in the survey is broken down by 'formal' and 'informal' training, with 'formal' loosely relating to a structured approach to training and 'informal' including activities like watching others doing the job. Clearly this is a useful distinction, but some of the usefulness is lost because formal training is reported by the individual in days undertaken while informal training is only reported as having been undertaken or not. Booth finds a significant relationship between training and wages, with the effect being particularly evident for women.

Lynch, Lisa (1992), "Private-Sector Training and the Earnings of Young Workers", *American Economic Review*, Vol. 82, No. 1, pp. 299-312.

Lynch (1992) begins her study of the link between training and wages by making the following observation:

> Due to a lack of appropriate data, researchers have been unable to examine directly the impact of private sector training on wages in any comprehensive way. Consequently, many have had to infer this impact from the shape of wage profiles. (p 299)

She overcomes this difficulty by drawing on a survey conducted in the United States, the National Longitudinal Survey youth cohort (NLSY). In this survey, 12,686 males and females who were 14-21 years of age at the end of 1978 were interviewed every year starting in 1979. Lynch uses the data up to 1983. Extensive information on their training activities is collected. In particular, individuals report how many weeks they had spent in on-the-job training, off-the-job training (such as in vocational colleges) and in apprenticeships. Information on wages is also included.

Such data allows Lynch to do two things. First, she can work out how individual characteristics influence the likelihood of receiving training. As this is not our primary interest here, we will look at her second task, that is estimating how different forms of training effect wages. She finds, among other things, that off-the-job training acquired with either the current or previous employers increases wages. She does this by estimating regression equations, with the log of wages as the dependent variable. However, on-the-job training with a previous employer does not increase wages. The difference in the impact of on- and off-the-job training with a previous employer may be because the 'on' may be specific to that employer whereas the 'off' may be more general. It could also be that current employers are only prepared to recognise off-the-job training from a previous employer because the content is more transparent.

Holzer, H., R. Block, M. Cheatham, and J. Knott (1993), "Are Training Subsidies for Firms Effective? The Michigan Experience", *Industrial and Labour Relations Review* Vol. 46, No. 4, pp. 625-636.

Unlike the previous two studies which looked at training benefits from the perspective of the individual, this study looks at training from the perspective of the firm. The data used arose out of a grant programme run by the State of Michigan, through which grants were made available to manufacturing companies for the financing of training. By surveying companies which had received grants, and others who had applied but did not receive a grant, a data set was generated with information on training inputs and companies' outputs. Hence, the authors were able to explore whether there was a link between the two, working with samples of between 171 and 250 firms.

One particularly useful feature of the data is that it provides information on the companies over a number of years. In attempting to link training and productivity this is important. With data for one year, any observed relationship between training and productivity must be treated with caution. If there is an aspect of the firm which is correlated with training and which also increases productivity, but which is not observed in the data, then the effect of training may be overstated. For example, if management quality is high in a firm, this may lead to greater training and to greater productivity. A statistical analysis with one year of data will miss this point and will attribute the management effect on productivity to training, thus overstating the effect of training. With data for more than two years, this problem is reduced somewhat. If the unobserved characteristics of the firm do not change over time, it is possible to look at how productivity *changes* across firms are related to *changes* in training.

Holzer et al. use the scrappage rate[1] as a measure of productivity and hours of training per employee as their measure of training. They find that increased training reduces the scrappage rate; for example, a doubling of the amount of training per employee reduces the scrappage rate by about 7 percent. Hence, they find evidence of a direct link between training and productivity.

[1] The "scrappage rate" is the proportion of units manufactured that must be discarded due to faults.

Van Sandick, A.S., and A.M. Schaap-Neuteboom (1993), *Het rendement van een bedrijfsopleiding: Een instrument voor het bepalen van het financiële rendement van trainingen*, Groningen: RUG.

This study involved the estimation of the profitability of training for managers in a large Dutch supermarket. As all managers underwent training, it was not possible to conduct a treatment-and-control-type study. Instead, the approach adopted was to compare managers, who underwent training, with others who performed the same tasks as managers on occasions, but who were not managers and thus did not undergo training. The effectiveness of the training was evaluated by means of interviews with the employees in question, more senior managers and other employees.

The most interesting aspect of the study for current purposes involves the manner in which the perceived effects of training were translated into monetary amounts. It is a general theme of this review that putting monetary values on the effects of training is not a simple matter, and as such, the approach used here may point to a possible pragmatic approach to overcoming this difficulty. In essence, the effects of training for each worker are estimated on a number of 5-point scales. Scores for each worker are calculated, and assumed monetary values are attached to them. There is clearly an ad hoc element in the selection of the monetary values, but the approach does allow for a range of estimates. It can be argued that the range can be too large to be useful and this is certainly an argument that must be taken seriously.

Bartel, A. (1994), "Productivity Gains from the Implementation of Employee Training Programs", *Industrial Relations*, Vol. 33, No. 4, pp. 411-425.

Bartel (1994) looks at the link between training and productivity using another survey of employers, the Columbia Business School survey. Like Holzer et al., her data covers a number of years, so it is possible to relate changes in training input to changes in productivity. Her measure of productivity is based on sales. Her training measure is somewhat weak in that it is the proportion of workers trained. She does find a positive

effect of training, although interpreting the effect is difficult because of the nature of her training variable.

Bishop, John H. (1994), "The Impact of Previous Training on Productivity and Wages", in Lisa Lynch (ed.), *Training and the Private Sector: International Comparisons*, Chicago: University of Chicago Press.

A different approach to testing for the training/wage link is taken by Bishop (1994). Whereas other studies such as Booth (1991) and Lynch (1992) used large-scale surveys of individuals, Bishop uses two surveys of employers conducted in the United States. The first is the Employment Opportunity Pilot Project - National Centre for Research in Vocational Education (EOPP-NCRVE) survey which was undertaken in 1982. Although 3,412 owners/managers were interviewed for this survey, only 480 were of use to Bishop in this study due to the particular nature of the analysis. The second survey was one conducted by the National Federation of Business; questionnaires were mailed to around 11,000 firms, of which 2,599 responded. For his analysis, Bishop was able to use 2,285.

In these surveys, amongst other things, the employers were asked to provide information on two of their employees, in particular information on their training, wages and productivity. Bishop then compares the experiences of the two workers across a large number of firms. In order to explore the link between training and the outcomes of interest, Bishop constructs a 'training-time index'; he does this by taking the amount of time reported in different forms of training and multiplying it by the cost of that time. If a trainer is involved in the training, this cost is added to the cost of the trainee's time. In general, Bishop finds that training increases wages and productivity, but he draws attention to two other findings. First, the increase in productivity is greater than the increase in wages, so training is profitable for employers. Second, training received from a previous employer increases wages, but again, it increases productivity more. Hence, there is a 'spillover' from employer-provided training, in that the training provided by one employer benefits another.

Groot, Wim, Joop Hartog and Hessel Oosterbeek (1994a), "Returns to Within Company Schooling of Employees: The Case of the Netherlands", in Lisa Lynch (ed.), *Training and the Private Sector: International Comparisons*, Chicago: University of Chicago Press.

Groot et al. (1994a)[2] draw attention to an important issue in the estimation of training effects, that is the fact that training is likely to be acquired by those who will use it best. It may be that employers will chose to train certain workers or because certain workers will volunteer for training; either way, there will be a selection process. The importance of this point in estimating the effect of training on wages is that if the observed effect is based on those who were selected for training, and not randomly assigned to training, the effect for the random individual will be over-stated. Using Dutch data, Groot et al. employ a particular statistical technique to take account of the selection issue. They show that while the effect of training on the wages of those who participate is positive, there would not have been a positive effect for those who do not participate, had they trained.[3]

Diederen, J. (1994), *Opleidingsniveau en heroepsloophaan: Over de effecten van initiële opleiding en additionele scholing op de heroepsloophaan van lager opgeleiden*, Nijmegen: ITS.

This study is based on a large-scale survey of individuals. The researchers had available to them a longitudinal dataset based on a group of people who left primary education in 1965; the most recent interviews took place in 1987. For the purpose of the study, only the less educated were analysed, leaving a sample of 780. The dataset allowed the researchers to assess how both initial training and post-initial training had affected wages. However, a range of other dependent variables were looked at; for example, unemployment, job and function changes, motivation, attitudes to work and general career success were also considered. It was found that CVT increased interest in work

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[2] The point is also made and developed empirically in Groot (1995).

[3] The selection issue is discussed in Booth (1991) and Lynch (1992), and Lynch estimates a model where a selection-correction procedure is used; however, the point is not stressed in either of these two studies. Another paper by Groot et al. (1994b) is concerned with the self-selection of individuals into employer-provided training programmes.

and also the willingness to change jobs. Again, this raises the issue of other dimensions of training effectiveness which could possibly be measured.

Lynch, Lisa and Sandra Black (1995), "Beyond the Incidence of Training: Evidence from a National Employers Survey", National Bureau of Economic Research Working Paper No. 5231, Cambridge, Massachusetts.

Black, Sandra and Lisa Lynch (1996), "Human Capital Investments and Productivity", *American Economic Review*, Vol. 86, No. 2, pp. 263-267.

Black, Sandra and Lisa Lynch (1997), "How to Compete: The Impact of Workplace Practices and Information Technology on Productivity", National Bureau of Economic Research Working Paper No. 6120, Cambridge, Massachusetts.

The estimation of the training/productivity relationship has recently been advanced in a series of papers by Lisa Lynch and Sandra Black (Lynch and Black, 1995; Black and Lynch, 1996; and Black and Lynch, 1997). As with many aspects of empirical research in the social sciences, their advances have been facilitated by a new dataset which, as the authors put it, "was designed to overcome some of the limitations of previous studies and collect more precise data on human-capital inputs and establishment inputs" (Black and Lynch, 1996, p. 263). The dataset derives from a survey from the National Center on the Educational Quality of the Workforce National Employers Survey (EQW-NES); through a phone survey in 1994 it generated responses from 1,621 manufacturing companies and 1,324 non-manufacturing companies.

The authors use the data for a number of purposes. For current purposes, the first results of interest are found in the 1995 paper[4]. Production functions are estimated for the manufacturing and non-manufacturing sectors, in which dimensions of training are included along with the more usual factors in production functions such as capital and labour. The results on training are interesting; the number of workers trained is not

[4] The same results are found in the 1996 paper, a published version of a section of the 1995 working paper.

found to have a significant effect on productivity, but this masks the effects of different dimensions of training, which do matter. In manufacturing the higher the proportion of training that is off-the-job, the higher is productivity. Similarly, in non-manufacturing firms the type of training matters for the productivity effects; in particular, training in computer skills increases productivity.

As the results presented in the 1995 and 1996 papers of Black and Lynch are based on data from a single year, they suffer from the problem discussed above of failing to take into account time-invariant unobservables.[5] In the 1997 paper, they attempt to overcome this problem by supplementing the EQW-NES data with data from the Longitudinal Research Database (LRD) of the United States Bureau of the Census. The authors were able to match the companies in the EQW-NES with records in the LRD and thereby create a dataset with over time information on the companies. In re-estimating their earlier work, they now find no effect of training on productivity; however, this might be because the information on training was too weak for its effect to be captured in the extended estimation framework. What does emerge from this study is the interesting effect that workplace practices have on productivity. In particular, greater involvement of workers in decision-making and the use of performance-related pay are seen to generate higher productivity relative to the more traditional labour/management relations. Such workplace practices will be discussed again below in the context of the paper by Ichniowski et al.

Ichniowski, Casey, Kathryn Shaw and Giovanna Prennushi (1995), "The Effects of Human Resource Management Practices on Productivity", National Bureau of Economic Research Working Paper No. 5333, Cambridge, Massachusetts.

While this paper is limited in its references to training, it is nonetheless of interest both from a methodological point of view and for its results. The purpose of the paper is to assess the impact of human resource management practices generally, including training. However, the focus is not so much on the effects of individual policies; rather, an attempt is made to estimate the effects of collections or systems of policies. The theory underlying this approach is that human resource policies will have

complementary effects: the use of certain policies in isolation will have a weaker effect than when such policies are combined with other human resource measures.

In order to test the theory, the authors visited 26 steel plants in the United States and collected longitudinal data on workplace practices, productivity, technology and wages. They restricted their attention to a very specific process, thereby easing the comparisons across workplaces. The measure of productivity used was the proportion of "up-time" in production, i.e. the proportion of time during which the process was not stopped for whatever reason. They found that the hypothesis of complementarity among human resource measures, including training, was supported by their data. A similar finding on workplace practices can be found in Black and Lynch (1997), referred to above: they find that the effect of a human resource policy depends not so much on its introduction but on the manner of that introduction, i.e. whether other polices are introduced along with it. Such findings raise an important consideration for further research into the effects of training: if the effects are enhanced by the presence of other policies, it will be useful to structure the research so that this can be captured.

Ichniowski et al. discuss another important issue which deserves our attention: having found that the introduction of human resource management systems produces productivity gains across the sample of firms, they ask why it is that not all workplaces introduce such systems. Their suggested answer centres on the indirect costs of introducing such policies. In particular, where workers resist doing things in a new way, the costs generated by of the upheaval caused may outweigh any long-term productivity benefits. This point is important in that while training may have positive effects on average, a firm's decision not to provide training may not necessarily be due to its managers' ignorance of training benefits.

[5] This is acknowledged by the authors; see p. 266 of the 1996 paper.

Ottersten, Eugenia Kazamaki, Thomas Lindh and Erik Mellander (1996), "Cost and Productivity Effects of Firm Financed Training", The Industrial Institute for Economic and Social Research Working Paper No. 455, Uppsala, Sweden.

Ottersten, Eugenia Kazamaki, Thomas Lindh and Erik Mellander (1997), "Evaluating Firm Training Effects on Performance and Labor Demand", mimeo.

One of the few European econometric studies is that of Ottersten et al. (1996)[6]. The primary contribution of this study is to the theoretical modelling of the effects of training. Whereas all studies discussed to date have focused on the relationship between training and productivity, Ottersten et al. present a model of the relationship between training and cost reduction. There is, of course, an inverse relationship between productivity and cost, so while the focus may be different, the core issue is the same as in the studies already reviewed. The authors test their model using annual data from eight Swedish firms in the machine tool industry for the years 1975-1993; empirically they find large cost effects of training, although the effects as measured by productivity are smaller[7].

Von Bardeleben, R., U. Beicht and K. Fehér (1995), "Betrachtung des Nutzens betrieblicher Ausbildung", in U. Beicht, R. von Bardeleben and K. Fehér (eds.), *Betriebliche Kosten und Nutzen der Ausbildung. Ergebnisse aus Industrie, Handel und Handwerk*, Bielefeld: Bertelsman

Although this study was primarily concerned with training under the German dual system, and as such relates to initial training, it raises a number of issues which are relevant to this review, given that the training being studied is enterprise training. Two approaches were taken in considering the costs and benefits of training. A large-scale survey was conducted, in which 1,370 enterprises were interviewed. However, as it was

[6] Their 1997 study has a similar orientation.

[7] One other European study is that of de Koning and Gelderblom (1992). As their dataset is particularly small (50 companies), their finding of no impact of training on productivity is of limited use. Ottersten et al. have fewer firms in their dataset, but the availability of annual data for 18 years adds richness to their data.

believed at the outset that capturing the benefits of training would be difficult using this approach, case studies were also undertaken.

While it was concluded from the case studies that it was extremely difficult to get reliable information on the returns to training in monetary terms, the survey included a number of questions which allowed for other effects of training to be identified. Firms were asked their reasons for training workers as opposed to hiring workers who are already trained, so in a sense the issue being considered is the cost-effectiveness of training relative to hiring those already trained. Among the reasons for training mentioned by a large proportion of firms were the following:

1. To get skilled workers who could not be recruited from the labour market;
2. To avoid high turnover, by tying the workers more closely to the firm;
3. To be able to identify the best workers from among the trainees.

The value of this study is to generate thought on what dimensions of training, other than productivity growth, may be measurable.

Van der Sanden, J.M.M., and G.E.J.M. Hornman (1995), "Zelfstandig leren op de werkplek met behulp van de Leittextmethode", in M. Mulder and W.S. de Grave (eds.), *Ontwikkelingen in branche- en bedrijfsopleidingen*, Utrecht: Lemma.

The dimension of the "training-returns-estimation" issue to which this study draws attention is the potential for focusing on a very particular type of training. In the study, the 'Leittext' method[8] was being evaluated; this method aims to empower and encourage workers to learn and to work independently. The approach adopted was to compare two small groups of workers, those who underwent the 'Leittext' training, and those who did not. The methodology used is also instructive, in that the study gathered information on both the treatment and control groups both before and after the training,

[8] The Leittext method is an approach to training which aims to stimulate learning and working in a self-regulated way. Training constructed according to this method, for individuals or groups, usually entails a number of well-defined instructions. To perform each of these instructions, six different cyclical phases have to be passed: informing, planning, decision-making, executing, controlling and evaluating (and back to informing again, etc.). Each phase involves both theory and practice learning.

thereby creating the potential for measuring the net effects of the training. However, a general difficulty in this area was also highlighted; managers found it difficult to evaluate whether there was an increase in the willingness of workers to work independently.

Von Bardeleben, R., U. Beicht, H. Herget, and E. M. Krekel (1996), *Individuelle Kosten und individuelle Nutzen beruflicher Weiterbildung*, Bielefeld: Bertelsmann.

This study involved a survey in which reasons for training were sought. While some studies have asked firms their reasons (von Bardeleben et al., 1995), this study was concerned with individuals. This study aimed to assess the individuals' views of the extent to which their goals in training had been realised. The main contribution of the study for current purposes is the identification of training effects other than the wage effect. Again like the previous study, the development of measures of training other than the wage effect may facilitate work in this area. Among the goals identified by the individuals surveyed were better work performance, more interesting or responsible tasks and increased mobility. One of the most interesting findings of the study was that higher wages ranked below a range of other training goals. If this finding generalises to other populations, it has important implications for which dimensions of training effectiveness we should be measuring. Another interesting finding was that the priorities which individuals held for training differed between Eastern and Western Germany; this indicates that societal, or more specifically, labour-market-related conditions impact upon the goals of training.

Huselid, Mark A. and Brian E. Becker (1996), "Methodological Issues in Cross-Sectional and Panel Estimates of the Human Resource-Firm Performance Link", *Industrial Relations*, Vol. 35, No. 3, pp. 400-422.

In discussing the work of Holzer et al. above, we referred to the advantages of studies which present data over time on a cross-section of firms, i.e. a panel. Such datasets allow for *changes* in practices to be associated with *changes* in productivity, thereby avoiding upward biases in estimates where a correlation exists between the presence of training and unobserved firm characteristics. While Huselid and Becker accept this

advantage, they point out that in working with differences in values over time another difficulty is introduced into the analysis, that of measurement error. If recorded values of any independent variable are not entirely accurate measures of, for example, training input, but instead are subject to a random measurement error, the coefficient estimates associated with that variable will be biased downwards. If measurement error exists, the difficulties it creates are increased in differenced equations; the authors believe this to be a serious problem in accurately measuring the effects of human resource measures generally.

An additional point made by Huselid and Becker relates to response rates for surveys used in this type of research. In their own study, they mailed questionnaires to 3,477 firms in 1992 and 3,847 firms in 1994. However, response rates were only in the 20-30 percent range. In addition, less than 10 percent of firms responded to both surveys, further restricting the panel estimates. Such low response rates inevitably raise questions about possible selection biases in responses, and while statistical techniques are available to correct for selection bias, the small sample sizes can reduce their usefulness. Huselid and Becker are of the impression that the lack of response arises because companies have a policy of not responding to surveys and/or because their workloads preclude participation. The authors comment that "such policies will only make survey research on this topic more difficult in the future". In the short term, the lesson would appear to be that while studies based on samples with low response rates can yield insights, results must be interpreted and applied carefully.

OECD (1996), *Measuring What People Know: Human Capital Accounting for the Knowledge Economy*, Paris: OECD.

We include this study in the review not so much because of the methodology involved, but because of its general subject matter. The issue which this study investigates is whether human capital accounting is possible and feasible in theoretical and practical terms.

Economists currently estimate human capital on the basis of schooling years or formal educational attainment levels, regardless of actual productive capacity. Financial

accounting and reporting mechanisms ignore even these crude measures and, due to certain conventions, omit the value of human capital from the balance sheet.

A review of innovative policies in OECD countries shows that progress has been made in moving beyond the basic information provided in standard educational certificates. Encouraged by the notion of a 'knowledge economy', government policy makers, human resource managers, financial accountants and educationalists are developing methods for systematically evaluating and recording knowledge as assets acquired through experience, education and training.

This study explains why it is possible in terms of economic theory, and feasible from the perspective of accounting practice, to implement new human capital information and decision-making systems. Reviewing the steps already being taken by individuals, firms and governments to improve the functioning of human capital markets leads to the conclusion that public policy must focus on the development of better signals for competence validation, valuation, accounting and financial reporting. Embracing a pragmatic approach, the policy directions suggested here build on the emerging new standards and institutions. According to this study, in the future the largest share of value-added in the economy as a whole will come from activities where people add their personal knowledge, insight and vision to a product (tangible or intangible). The radical break occurs when a large share of the economy shifts away from activities that are routine, repetitive and based on someone else's instructions to production that is inventive, customised or personalised.

Grünewald, U., D. Moraal, D. Gnahs, F. Draus and R. Weiß (1997), Abschlußbericht zum BMBF-Projekt Formen der 'weichen Bildung' (draft version).

This study is concerned with the possibilities of generating quantitative information on what the authors refer to as 'informal' types of training or 'work-integrated' training. In the course of the study, the authors also identify a range of sub-categories within 'informal' training. Broadly defined, they create sub-categories along the dimensions of off-the-job and on-the-job training and also along the dimensions of individual and

group processes. Hence, they produce a comprehensive range of types of training, although the distinction between them is not always as sharp as the classification may indicate.

Having generated the categorisation, the authors reveal the problems which arise, as mentioned in interviews with enterprises, in trying to move toward a quantitative analysis of 'informal' training. These are (a) the difficulty of creating a demarcation between work and 'work-integrated' training and (b) the prohibitive time and energy input, as perceived by firms, in generating and gathering the information.

Barrett, Alan and Philip J. O'Connell (1998), "Does Training Generally Work? Measuring the Returns to In-Company Training", Centre for Economic Policy Research (CEPR), Paper No. 1879, London.[9]

Barrett and O'Connell (1998) use a dataset constructed over two points in time to estimate a training/productivity link. The first component of the dataset is a survey of Irish companies conducted in 1993 in which firms were asked for detailed information on their training activities. The second component of the dataset is a follow-up survey of the same companies conducted in 1997; this time the companies were asked for information on, among other things, output, capital stock and workplace practices in 1993 and 1995. About 200 firms provided sufficient information for them to be used in the analysis. Given the way the data had been gathered, the authors were able to test for a relationship between the training input and changes in output and productivity. A finding similar to Black and Lynch (1996) emerges in that training itself is not seen to influence productivity; rather it is the type of training that matters. In the Barrett and O'Connell study, training that was described by the employers as being 'general' in nature (that is, useable elsewhere) increased productivity, but training that the employers classified as 'specific' (that is, not useable elsewhere) had no impact on productivity.

[9] A summary of this paper can also be found in CEDEFOP (1998), *Approaches and Obstacles to the Evaluation of Investment in Continuing Vocational Training: Discussion and Case Studies from Six Member States of the European Union.*

2.2 Conclusions

Having presented the papers in a somewhat unstructured way, we now want to draw out the major themes and issues. Some of the studies can be grouped together because they attempt to establish a link between training and productivity using standard statistical techniques. Some have done this indirectly by establishing a link between training and wages and assuming that higher wages are paid when productivity is higher. Some have established the link directly by estimating links between training and productivity, defined in various ways. Other studies have looked at other training effects such as increased job satisfaction and reduced unemployment. All of the studies are very recent, reflecting that this is a new area of research. The reason for this is that, until recently, the datasets upon which the studies are based were not available. To a great extent, the quality of the results obtained are functions of the quality of the data with which the researchers worked.

Although this review includes the word "returns" in the title, it is apparent from the above research that rates of return in the strict economic/financial sense of the word have rarely been estimated. What has been done is to relate training inputs, to the extent that the data allows such inputs to be measured, to training outputs, again in a manner that is dependent on the data available. We have not found many calculations which relate the initial investment in training to the flow of benefits over time, thereby producing an estimate of a rate of return in a manner which is done for investment in capital assets. Any such calculation would be subject to considerable uncertainty. This is partly due to data limitations, but also to the lack of good information on the speed with which the acquired skills depreciate or the extent to which employees change jobs. As the information on returns is so limited, it is not surprising that there is no information on how the size of the return might be related to the size of the training investment. As with many investment activities, it is likely that the returns to training investment start to diminish beyond a certain level. Such information would clearly be of great use in this area, although we appear to be a long way from obtaining it.

One exception to this lack of rate-of-return calculations is the paper by Mincer (1991). He gathers results from a range of studies and, imposing certain assumptions, estimates

a rate of return; for example, if a depreciation rate of 4 percent is assumed, returns ranging between 8.7 and 26 percent are found. However, in discussing whether there is evidence of under-investment in training, Mincer says the following: "..., there is no evidence of under-investment, though it clearly cannot be ruled out, given the wide range of estimates." Hence Mincer, too, appears to say that we do not have what might be considered to be a reliable estimate of returns to training.

While the research in this area may not have produced a reliable measure of the rate of return to training, it has nonetheless produced many interesting insights. In general, training is found to have a positive effect on wages (e.g. Lynch, 1992, and Booth, 1991) and productivity (e.g. Black and Lynch, 1996; Bartel, 1994; and Holzer et al., 1993). In addition, as Bishop (1994) found, the productivity effect is greater than the wage effect, thus making training a profitable activity for firms.

Lynch (1992) also found that while off-the-job training with a previous employer increased wages with a current employer, on-the-job training with a previous employer did not. There are two important implications of this result. First, it is possible that current employers only reward previous off-the-job training because the content of such training is more transparent. If this is so, there is a reduced incentive to undertake on-the-job training for employees who believe they will change jobs at some stage. Second, the fact that current employers reward previously acquired off-the-job training implies that such training raises productivity in the current job. Hence, if this previously acquired training was financed by the previous employer, there is a "spillover" effect from one employer to another. Such an effect was also found by Bishop (1994), and so the possibility exists that there is a reduced incentive for employers to provide training. This, of course, is the familiar issue that if training is general in nature, in the sense of being applicable in other workplaces, employers may require the employees to finance the training, since the employer would not be in a position to appropriate any return on the training investment if the employee were to leave.

Groot et al. (1994a) demonstrate the important point that in estimating the effects of training across a range of individuals, one must be aware that people self-select into training: hence estimates which do not take account of this may over-estimate the

effects of training for some. Ichniowski et al. (1995) draw attention to this fact from the perspective of firms when they discuss why it is that some firms do not introduce training measures, even though such measures appear to have strong productivity effects when viewed across the sample as a whole. Statistical techniques do exist to overcome the difficulties associated with self-selection, but there can be limitations on their usefulness in certain circumstances. When self-selection corrections are not employed, care must be exercised in generalising results.

Black and Lynch (1996) and Barrett and O'Connell (1998) found evidence to suggest that the provision of *different types* of training matter more for productivity than the provision of training per se. In Barrett and O'Connell, training that is general in nature is shown to be more effective than specific training in raising productivity. Black and Lynch (1996) find that in the non-manufacturing sector, the provision of off-the-job training is what matters.

Other studies reviewed indicated the importance of combining training with other human resource measures in order for the training, and indeed the other human resource measures, to be effective (Ichniowski et al. 1995); clearly, this is an important point to keep in mind when trying to identify and measure returns to training.

While the focus of much of the work is on measuring returns in terms of wage and productivity increases, some of the studies brought attention to other effects of training. For the enterprise, such other important effects may include reduced turnover (von Bardeleben et al., 1995). For the individual, the other effects may include reducing the probability of unemployment (Diederen, 1994), making work more interesting and increasing the possibilities of changing job functions or jobs (von Bardeleben et al., 1996).

The measurement of the effects of certain types of training may yield useful results, especially if there is a specific goal attached to that training, for example, encouraging independent learning under the 'Leittext' as discussed by van der Sanden and Hornman (1995). Generally, the categorisation of training can also assist in return estimation exercises, although problems do remain; for example, it is not always easy in practice to

draw sharp distinctions between training types, or indeed between work and work-integrated training (Grünewald et al., 1997).

Finally, although the issue of how to attach monetary values to dimensions of human resource investment runs through all the work considered here, we have seen how a pragmatic approach can be adopted, in which value ranges are used (van Sandick and Schaap-Neuteboom, 1993). We have also seen the beginning of a more systematic approach through the generation of more formal accounting procedures related to human resources (OECD, 1996).

Drawing together these conclusions we can say the following:

- strict rates of return, like those calculated for physical assets, have rarely been calculated
- training is shown to have a positive effect on wages
- training is shown to have a positive effect on productivity
- there is evidence to suggest that training received from one employer increases productivity and wages with another employer
- selection effects matter in training: i.e. the benefits are higher for those who choose to train compared to those who choose not to train, were they obliged to train.
- different types of training matter for productivity effects, as does the combination of training with other human resource policies
- individuals and firms have objectives for training other than wage and productivity growth

Having reviewed many of the recent, prominent studies in the area and drawn conclusions, in the next section we will present the issues which arise in the estimation of returns to employer-provided training in a more general manner. Once again, our goal is not to present information as an end in itself, but rather to stimulate thought and discussion.

SECTION 3: Some central issues - an overview and discussion

Having reviewed a range of studies and distilled the conclusions, we now alter our focus. In this section, we will discuss a range of issues which arise in measuring the returns to CVT investments. It should be noted that a number of these issues are closely linked and inter-dependent, and they should be viewed accordingly; nevertheless, we have tried to break them down as far as possible into discrete headings. In order to illustrate points, we will draw on the studies mentioned above and some additional references; however, our interest in this section is on general points and not on the specifics of each study. The headings under which our discussion will proceed are as follows:

- Evaluating CVT returns at the level of the enterprise
- Levels of evaluation
- Types and forms of training
- Types of returns
- Who receives the returns
- Methodologies

3.1 Evaluating CVT returns at the enterprise level

It is useful to consider the issue of CVT evaluation as it occurs at the enterprise level. This provides insights into a number of the general problems associated with evaluating training and gives some indication of what is required from social science researchers.

Although many articles and books have been written on how to evaluate training, many authors conclude that, in practice, firms rarely undertake a systematic evaluation of training (Dougherty, 1992; Mulder, 1995). Dougherty suggests possible reasons for this:

(i) *The cost-effectiveness of the training may be so obvious that formal evaluation is unnecessary.* Much employer-based training is so obviously cost-effective that it

would be a waste of resources to undertake a formal evaluation. For example, some training results from the adoption of new technology, and is often provided by the vendor of the new technology as part of a package. In this context, it is difficult to isolate the productivity effects of the training from the effects of introducing the new technology in order to evaluate the cost-effectiveness of such training.

(ii) *It may be impossible or prohibitively expensive to obtain the data necessary for a formal evaluation of training.* The economic evaluation of much employer-based training may not be a practical proposition for a number of reasons. First, it may not be possible to measure the productivity increase of the trainee. Much training is provided for workers who are not directly engaged in production, so any increase in productivity will be difficult to assess. In particular, it is difficult to undertake a convincing cost-effectiveness analysis of training provided for managerial and supervisory staff, which typically accounts for an important part of training. Secondly, it may not be possible to isolate the increase in productivity which can be attributed to training from the increase in productivity which can be attributed to complementary changes in the production process. Thirdly, it may be difficult to isolate the cost of training from the cost of production as skill development is often an inevitable by-product of the production process. And fourthly, even when it is in principle possible to make a formal evaluation of cost-effectiveness, the cost of the evaluation may render the exercise prohibitive (Dougherty, 1992, pp. 551-552).

To the extent that firms do evaluate training, they seem to do so mostly in an informal and incremental way. Grünewald and Moraal (1996) suggest in their case studies a variety of ways to assess the success of training in firms, albeit work-integrated learning only. These are as follows:

- the results of training can be examined and evaluated on the basis of key statistics or indicators, for example, number of complaints, delivery times, meeting delivery specifications, development of costs, illness of employees;
- continuous discussion can be undertaken between personnel department/supervisors and management;
- training results can be checked through giving trainees questionnaires, tests/examinations or through general monitoring;

- in 'quality circles', and other management processes, an implicit evaluation takes place through the process itself;
- testing the quality of products can be regarded as an evaluation instrument;
- client satisfaction is an important success criterion, so contact with clients can be an appropriate instrument.

These different means of assessing the results of work-integrated learning processes are used to varying degrees. Informal procedures dominate, and most enterprises use these to evaluate the success of training, rather than undertaking a strict cost/benefit analysis. Generally, if the objectives of the training have been seen to have been met, then this is viewed as sufficient evidence of a successful implementation of training measures.

While these procedures may be in place, the fact remains that enterprises in general do not rigorously evaluate their training expenditures. This provides an opportunity for researchers, but it also presents a first obstacle. The opportunity relates to the information gap that clearly exists. The obstacle concerns data: without firm level evaluation, it is unlikely that the sort of information needed for a comprehensive research evaluation would be available. Hence, it seems that great advantage could be gained if firms and researchers would collaborate extensively in putting the evaluation of training onto a more systematic basis. The collaboration could occur in generating data, collecting and analysing it. We will return to this theme in our overall conclusions.

3.2 Levels of evaluation

One aspect of measuring the returns to CVT is to identify the level at which the evaluation should take place. This is an important issue when considering what outcomes should be addressed in order to measure the returns to training in future work. Hence, to put some order on this dimension of the overall issue, we present here a categorisation of levels.

In 1959 Kirkpatrick - one of the founding fathers of research on returns to training - developed what is now considered the classic four-level approach to the evaluation of

training, which focused on:

Level 1 - ***reaction*** - i.e. did participants adjust to/like it?
Level 2 - ***learning*** - i.e. did participants learn?
Level 3 - ***behaviour*** - i.e. did participants use what they had learnt?
Level 4 - ***results*** - i.e. did the training fulfil its stated (or other) objectives?
(Kirkpatrick, 1959).

It should be noted that these levels do not represent mutually exclusive outcomes but rather they are different, and often inter-related, manifestations of the returns to training. For example, measuring level 3 (behaviour) will also provide a fair reflection of level 2 (learning). This is not necessarily the case at level 4 (results), as this model can be viewed as combining two aspects of evaluating training returns: whether the training has been 'effective', i.e. did it meet its objectives, and whether the training has had an 'effect' which may be linked to general objectives of the enterprise or employees rather than to pre-defined objectives specific to the training.

Much of the research into the returns to training to date has focused on the first three levels of evaluation, given the number of data and methodological problems associated with level 4 (results) and the problem of identifying the objectives in order to develop appropriate indicators against which the training can be evaluated. As a result, much of this work has focused on the returns to the individual as an indirect, rather than a direct, indicator of the returns to the enterprise. Within this, research at level 1 (reaction) seems to be the most prevalent area of work (Dougherty, 1992; MacDonald, 1995; Mulder, 1995) within enterprises. Mulder (1995) states that most of the evaluation methods available are aimed only at observing the reaction of participants in training through surveying on the basis of 'happy sheets'. He assumes a lack of methods and techniques for training evaluation beyond level 3, which can be used in practice, and he concludes that few practical instruments are available at the enterprise level to evaluate training returns in terms of overall work behaviour as it benefits the firm, due to the need to evaluate the returns to training in a specific way within different contextual environments. The perceived absence of level 4 (results) evaluation is also illustrated in the title of an article by Shelton and Alliger (1993); "Who's afraid of level 4

evaluation?"

Recent research which has focused on level 4 has done so in terms of direct 'results' for the enterprise (e.g. Brinkerhoff, 1988; Kessels, 1993; Bewyl & Geiter, 1996) on the assumption that the major reason for launching training activities derives from firm-level problems. A number of evaluation models at this fourth level are aimed principally at observations concerning the success of solving organisational problems through training (Kessels, 1993). Many of the studies in Section 2 highlight an increasing emphasis on level 4 evaluation from the enterprise perspective, which also indicates an increasing ability to overcome a number of the data and methodological problems (these are discussed in more detail below).

Nevertheless, level 4 (results) evaluation remains hindered by the lack of an adequate definition of what constitutes training activity and the diffuculty of identifying what are the aims and rationale behind choosing particular types or forms of training as a means to evaluate returns against those aims and choices.[1]

3.3 Types and forms of training

The work reviewed in Section 2 has already pointed to the need to differentiate between types and forms of training. Training is a generic term for a number of very different types of activities and also a fluid entity. Bentsson and Würzburg (1992) indicate that the content of training is changing and being provided in a different way; this will clearly have an effect on the way the returns to such training can be measured. What remains unclear, however, is how training can be most usefully differentiated when estimating returns. As indicated by Tuijnman (1992): "continuing education is an elusive idea rather than a well-defined concept."

Various ways of categorising training forms are possible: e.g., on/off the job, formal/informal. As shown in Section 2, Grünewald and Moraal (1997) make a

[1] Further discussion concerning this issue can be found in an article by Sven-Åge Westphalen "Continuing Vocational Training: from statistical necessity to analytical complexity" to be published in issue 51.1 of the Journal of Vocational Education and Training in 1999.

distinction between 'off-the-job' and 'on-the-job' training. Most of the work in this area focuses on 'off-the-job' training; returns to 'on-the-job' training are rarely considered, despite the increasing importance of 'learning by working' in modern societies. Exceptions are the studies of Grünewald and Moraal (1996) and of Ichniowski et al. (1995), reviewed in Section 2, and the CEDEFOP report on the learning effects of work organisation, done in various EU-countries (e.g., the Dutch study: Onstenk and Voncken, 1996). The lack of research into the returns to 'on-the-job'/'learning by doing' relates to the difficulty of making a distinction between working and training.

In addition, training can be distinguished according to its content and aims: e.g. training for sales, training in computer skills, etc. Studies that have employed such a distinction have been able to generate interesting results on the relative impact of different types of training: e.g. Black and Lynch (1997) and Kirkpatrick (1994).

One of the problems associated with distinguishing training on this basis is that, at the level of the enterprise, training objectives are not always clear. In addition, training may have multiple objectives which are not easily ranked. Only when the objectives of training are clearly stated can the type of training which should be evaluated against the objective(s) be identified. While a number of enterprises do formalise their training objectives (e.g. training in new technology, health and safety training, training in quality control, etc.), it is sometimes difficult to determine what the actual goals are, and even whether they are 'real'. It is often the case that investment in training serves only the goal of legitimisation: i.e., investing to show that you are doing something about a problem/issue as it is defined by superiors, by law or by clients.

Defining training activity and identifying and linking it with its or other more general objectives would take us one step closer to identifying the type of return against which the training should be measured and evaluated.

3.4 Types of returns

The studies in this review indicate the difficulties which arise simply in defining returns; measuring those returns is even harder. This is partly due to the lack of training objectives discussed above. As a result, research into the returns to training cannot relate those returns to specific training objectives; instead the training is evaluated against more general objectives. For example, the returns to training may be measured in terms of productivity increases, but the training measure might include health and safety training, the objective of which is not necessarily an increase in productivity. Identifying returns in this way also assumes that the process within the type and form of training has been effective to meet the return criteria. Many of the studies reviewed link only the *incidence* of training, in terms of the volume of training activity undertaken by firms or on the participation rates of employees, with a general return.

In addition, as with most returns, the returns to training can accrue in both 'tangible' and 'intangible' terms, within which the demarcation line is not clear. With regard to tangible returns, a number of studies try to measure the benefits of training at the level of the enterprise in terms of *productivity*. The question arises, however, as to what measure of productivity should be considered: increased profitability, reduced costs, improved quality, reduction of faults, increased customer satisfaction, etc. As mentioned, this also implies that a certain measure of productivity can be affected by a variety of different training activities, and so it may be difficult to associate the precise training activity with its corresponding productivity effect. Kirkpatrick (1994) mentions exceptional situations in which this can be done; for example, increases in sales may be found to be directly related to a sales training program. As Kirkpatrick states, however, establishing a causal relationship between training activities and its effects is usually not possible. In this respect, both the lack of strict definitions in this field and the numerous objectives which training has for the different stakeholders impact greatly upon our ability to establish causal relationships.

For measuring intangible returns, *tangible* indicators have to be generated; this often involves making assumptions which are hard to verify. For example, an enterprise that tries to improve the social and communicative skills of its employees through training

might use the turnover rate of both training participants and non-participants as an *approximate* measure to investigate this particular effect of the training. However, such a proxy measure does not necessarily indicate whether the training itself has led to the desired or to the opposite 'return'.

The studies reviewed in Section 2 indicate a variety of returns that have been measured for both enterprises and individuals. For enterprises, evaluation tends to concentrate both on productivity and on the performance of participants: for example, Holzer et al. (1993) use a reduction in the scrappage rate; Barrett and O'Connell (1998) use a sales-based measure of output per worker; and Bartel (1994) uses a value-added-based measure of output per worker. Some larger companies, as described in Kirkpatrick (1994), have attempted to take into account direct returns at the organisational level (sales, turnover rates). Other, indirect returns (such as a reduction in recruitment costs) are not so well examined in the empirical studies found. Von Bardeleben et al. (1995) focus on this issue, but their research concerns initial vocational training in the dual system.

For the benefits which accrue to *individuals,* a number of studies measure the wage gains of participants and promotion opportunities as types of returns. Other kinds of studies - more sociologically oriented - in this area identify several types of tangible and intangible returns; some of these have been reviewed in Section 2 of this report. As an example of the non-wage return, one can consider the work of von Bardeleben et al. (1996) in which they look at increased job satisfaction and the increased chances of changing jobs.

To a large extent, the type of returns which are examined are a function of (a) the objective of the evaluation, and (b) the data which is available concerning the training. In addition, there is the issue of 'perspective', i.e. how the returns are appropriated for the different stakeholders.

3.5 Who receives the returns

One of the reasons this review was undertaken is the lack of information concerning to whom the benefits of training accrue: i.e., which perspective is most important when estimating how the benefits of enterprise training are appropriated between the different stakeholders? This issue is important for a number of reasons. If certain actors are in a strong position to appropriate the gains from training, they are also more likely to finance the training. Hence, if it is shown that firms appropriate significant gains, then one can assume that profit-maximising firms will provide such training. However, if firms are unable to appropriate the gains from certain *types* of training, such as training that is general in nature (following the Becker definition), they may fail to provide that type of training. Again, we discuss this issue in a general way, concerning what has arisen from the studies reviewed in Section 2, although we recognise that there are significantly different funding arrangements for enterprise training in different countries, which may enhance the relevance of certain returns from different perspectives.

The review in Section 2 indicates that research has been undertaken on the returns for individuals and for firms. One of the areas where research is particularly underdeveloped is returns to the state,[2] either in economic or social terms, and to individual sectors of the economy. Documents and literature are available about the potential benefits for the state of encouraging CVT investment, but these tend not to be empirically based (Kath, 1994).

Although no studies which attempted to estimate the benefits to the state of employer-provided training have been found, it is nonetheless of interest to consider here what these benefits might be and whether they can be measured. Possibly the most obvious return to the state is the increased tax revenue that arises from training which enhances productivity. Such productivity yields benefits to both the state and the enterprise if the trained workers remain within that enterprise. An increased number of trained workers

[2] Perhaps some exceptions can be found in Coopers & Lybrand (1996) and Denys & Aalders (1996), although this work contains many methodological limitations. Whilst not within the scope of this review study, the returns to training the unemployed for the state are more easy to quantify than the returns to training employees by firms, e.g. in terms of employment or unemployment rates. This can be illustrated in the Netherlands by the evaluation research done by NEI into the 'net-effectiveness' of training courses paid for by the Employment Services (de Koning, 1991).

may also lead to increased foreign investment which may also benefit the state - although not necessarily the *training* enterprise if their workers move.

In addition to providing direct revenue benefits for the state, it can also be argued that training can reduce state expenditure. This can arise, for example, if employer-provided training leads to a reduced incidence of unemployment and, hence, reduced spending on unemployment and social benefits. While such arguments can be used to justify state intervention into the provision of continuing vocational training, the complexity of the issues makes it difficult to identify the way in which the state appropriates its returns to enterprise training.

In addition, the returns to enterprise training organised at the collective (sectoral) level have rarely been considered. This type of training can be termed 'sectoral training policies', paid for by social partners at branch - or sectoral - level as a way to share and mutualise the training costs for enterprises in the branch and to reduce or avoid under-investment in training by firms (van den Tillaart and Warmerdam, 1995; Denys and Aalders, 1996).

While sectoral training policies differ in the way they are implemented, the aims of the training do not differ from that of policies undertaken by individual firms. In terms of the returns, however, at least two different dimensions can be identified: a) the comparison between individual firms within the sector which implement training and those that do not, and b) the extent of success in avoiding both free-rider behaviour and under-investment in training by enterprises. Concerning a), only one empirical study is known; it considers the implementation of training in three different sectors through case-studies (de Vries and Hövels, 1991). Concerning b), no empirical studies exist, although the social partners seem to find it worthwhile to maintain sectoral training policies and finance them from collective bargaining sources. One of the major reasons that the returns to sectoral training provision have attracted little attention in empirical research seems to be that it occurs in only a few countries (e.g. Netherlands, Belgium, France and Denmark).

Yet, given that the nature of the employment relationship might be changing through an increase in short-term and part-time contracts, where employers might be less concerned with training their existing workforce and employees are more transitory, it is perhaps more likely that the responsibility for continuing training might increasingly fall to the individual or the state (this is already the case in some countries). This trend may also be seen in relation to the growth in the number of small- and medium-sized enterprises, where the provision of training is disproportionately expensive. Such a situation reduces the relevance of considering returns from the individual enterprise perspective and suggests that returns to whole sectors or to a collection of firms of a particular size should be considered, as well as the returns to state funding, collective funds, and individual funding.

In addition, little research has been undertaken to consider the returns to training from a multi-stakeholder perspective as a means to understand more fully how the returns to training are appropriated. From the studies reviewed in Section 2, only one (Bishop, 1994) provides an indication that both the enterprise and the individual appropriate some of the training return.

One of the problems with identifying who appropriates the returns to training is associated with defining what constitutes a return from the different perspectives. To clarify this, we can assume that there are certain returns to training which are mutually beneficial to the individual and the enterprise; for example, research at level 3 (behaviour) tends to focus on the 'adaptability' of training within the workplace (e.g. certain dimensions of this are explored within studies by den Ouden, 1992; Gielen, 1995; Simons, 1992). The ability to utilise and 'adapt' training to the workplace can be a benefit both for the individual and the enterprise; the individual may be able to achieve higher levels of job satisfaction, wages, etc., while the enterprise will gain the 'return' through ensuring that a new or updated skill is gained. To some extent, both the individual and the enterprise will appropriate some of the training 'return'.

However, another dimension of training 'adaptability' is training 'transferability', where the skill gained or updated by the individual can be transferred to another enterprise. In this situation, there is the potential for the individual and the receiving enterprise to

appropriate more of the training 'return' than the enterprise that originally sponsored the training, i.e. the 'spillover' effect discussed earlier.

The different perspectives associated with training evaluation confound a number of other related issues, not least the type of returns which might be evaluated. For example, a study undertaken by Grünewald and Moraal (1996), while concerned with training evaluation at the level of the enterprise, found that different stakeholders within enterprises use different criteria and parameters for evaluating the returns to CVT. Training participants and training staff viewed learning results (level 2) as the most important indicator for training effectiveness; participants also viewed the effect of training on working behaviour (level 3) as an important criterion. For management personnel, however, the results at the firm level (level 4) were the most important definer of training effectiveness. In addition, some of the returns measured can be viewed as secondary to the beneficiaries; for example, the study by von Bardeleben et al. (1996) indicated that, for individuals, higher wages are not always the primary return from training.

However, von Bardeleben et al. (1996) and Grünewald et al. (1997) also indicate an overlap between certain returns and how they are perceived by organisations and individuals. This concerns certain specific, intangible returns: in particular, motivation of employees and better opportunities for workers to do their work properly. The latter type of return seems to be as important to the organisations as it is to individuals. Houman-Sörensen (1997) also indicates areas where goals are increasingly overlapping, such as enhancing productivity, mobility and employment.

Regarding the possible different perspectives within the enterprise, Van der Krogt (1995) has developed a model which considers the integration of work and training types, and within that, the different strategies of the different stakeholders. This work, amongst other things, highlights the need to create frames of reference for the different stakeholders rather than define one objective or return against which to measure training effectiveness.

This has implications for the direction of future work: researchers need to ensure that they are asking the right questions of the appropriate stakeholders concerning the returns to training. In addition, it could be useful to try to develop work along a multi-stakeholder basis in order to establish which objectives underly training activity from different perspectives and how varied types and forms of training lead to different returns and benefit appropriations. This presents a formidable challenge in terms of collecting data and formulating an appropriate methodological approach, a more general problem in this type of work.

3.6 Methodologies

Both quantitative and qualitative research methodologies have been used in this area. In addition, a number of case studies appear to use - sometimes exclusively - quantitative research tools as well (e.g. van Sandick and Schaap-Neuteboom, 1995).

Experimental research (where a group of workers within an enterprise are randomly assigned and trained for the sole purpose of evaluating the effects of training) in this area, while supported strongly in many conceptual studies, is rare. As a result, most studies "are likely to have suffered from variable sampling error and specification error resulting from selection bias, since only participants are investigated" (Tuijnman, 1992, p. 520). Quasi-experimental approaches were used, amongst others, by van Sandick and Schaap-Neuteboom (1995), van der Sanden and Hornman (1995) and some large companies described in Kirkpatrick (1994). Experimental research appears difficult for a number of reasons. Several studies mention the impossibility of establishing a control group in a company setting, due to both practical and ethical problems. In addition, experimental research is expensive and more frequently used in studies concerning the effect of state-provided job-training. One view is that experimental research - however useful it may be in eliminating the influence of 'disturbing variables' (e.g. selection effects) and in estimating the 'true' contribution of training to returns - also has its limitations, as it usually renders little information on the training *processes* that determine the impact of training.

More common than experimental research are the evaluation studies that compare the 'post'-training situation with the 'pre'-training situation, where employees have been assigned to training in the usual, rather than in a 'random' way. Much of this research simply relates inputs to outputs with little emphasis on the 'process'. Within this the outputs are also 'uncertain' in that the training goals are often unclear. As a result, the wrong type of output may be measured. In only a few of the studies are the goals of training pre-defined in such a way that the training results can be compared to these goals. In particular, surveys that concern employees in more than one organisation often lack information on the goals of training. The study of von Bardeleben et al. (1996) is an exception in this respect, in that it focuses on the balance between costs and benefits of training in a 'qualitative' manner, i.e. regarding the subjective experiences of participants.

The methodologies used are often determined by the type of CVT activity being examined. Studies on work-integrated learning (Grünewald et al., 1997) use case-studies and qualitative techniques (e.g. interviews). Grünewald et al. believe that a qualitative approach for this type of training seems the only appropriate one, given the complexity of the issues and the difficulty of generating quantitative measures. Studies evaluating 'off-the-job' training often use quantitative techniques because this type of training is more clearly defined and hence is more quantifiable.

Many handbooks[3] describe the research tools that are considered appropriate for evaluating each of the four levels of Kirkpatrick. In general, the research techniques undertaken in any given situation are partly determined by the level of evaluation being examined. Level 1 tends to be assessed through questionnaires; levels 2 and 3 by tests, questionnaires and interviews. Evaluation at level 4 involves not only the most difficulties, but also the greatest variety in research techniques used: questionnaires and interviews as well as quantitative measures of training outputs, e.g. productivity.

With respect to econometric studies which use large-scale datasets, certain

[3] For example, Craig, Robert L. (1996), *The ASTD Training and Development Handbook: a guide to human resource development*, 4th ed., New York: Mcgraw-Hill; Philips, Jack J. (1997), *Handbook of Training Evaluation and Measurement Methods*, 3rd ed., Houston: Gulf.

methodological problems should be noted; they refer to self-selection, low response rates in surveys, and bias both in cross-sectional studies (due to unobserved firm characteristics) and in panels (due to measurement error). The studies highlight a number of these issues. Such problems are compounded when undertaking research on a cross-firm, cross-sectoral and cross-national basis. Even at the firm level, different governing strategies and approaches will make comparative work difficult. A number of different factors affect a firm's human resource strategies; such factors and the balance between them will alter according to the nature of that firm. These research problems and potential errors become more pronounced at the macro-economic level.

While issues such as selection effects raise difficulties for quantitative approaches, these difficulties are not entirely insurmountable; the real challenge is to design a research strategy that reduces as far as possible any problems associated with the data or their analysis. Since low response rates are a problem which plagues work in this area, it is very important that efforts be made to ensure the highest possible response rate. The use of personal interviews rather than mail- or phone-based questioning usually leads to a higher response rate. Such an approach is also more expensive, so a trade-off must bemade. It can also be helpful for researchers to enlist the support of groups such as trade associations in an effort to generate higher response rates.

With regard to the comparability of data across firms and across countries, careful initial planning is again required. One way to enhance comparability is to study similar firms; however, a trade-off must again be made because the more limited the group of firms being studied, the harder it is to generalise from the results. For this reason, it is preferable to ensure that the data collected across firms is as comparable as possible. As all firms collect data on profit, sales, etc., as part of usual business practice, this kind of information can be used, as it is by Barrett and O'Connell (1998) and Black and Lynch (1997). But it should also be possible to ask firms to collect information on issues such as staff turnover, which are again comparable. As with the low response rate issue, the challenge for the researcher is to come up with innovative ways of overcoming obstacles.

Finally, on the issues of self-selection and cross-sectional bias, some of the studies reviewed indicate how these difficulties can be overcome through the use of techniques of first-differencing and selection-correction. As Huselid and Becker (1996) point out, other problems can arise when efforts are made to address one econometric difficulty. But again, we would argue that this does not mean that efforts should stop; instead, greater efforts should be made to advance knowledge. The solution to some econometric difficulties can sometimes be found in the data-collection process; solutions to other difficulties require advances in technique. In the meantime, the existing tools provide the best means available to us and they should be used with care and honesty, in the sense that result write-ups should advise caution when there are reasons to believe that econometric results might be contaminated in some way.

It is clear, therefore, that different types of CVT and different levels of evaluation as well as the different 'return' perspectives have a significant influence on the method employed. In addition to this, the methodological approach is also influenced by the data which is available or can be collected.

SECTION 4: Conclusions and further work

4.1 Conclusions

The following quote from an education and training manager of a large company is cited in Kirkpatrick (1994): "We know that training pays off. Never doubt that. The dollar return is there, and it is high." To a great extent, the central issue of this review is whether or not there is hard scientific evidence on this point and how additional evidence can be generated. It is true that many of the studies reviewed found positive effects of training. However, very few of the studies have linked the benefits back to costs in a way that allows us to think in terms of a rate of return. Hence, the question still remains: at the 'margin', should business be spending an extra ECU on training, or on physical capital, marketing, etc.?

It can be concluded from our review that the amount of empirical research concerned with estimating the returns to CVT is rather sparse and underdeveloped, relative to other areas of investigation. Insofar as studies at level 4 (results) have occurred, their focus has been on individuals and enterprises, rather than on the state or sectors/branches. Within this, very few studies which try to apportion returns across the stakeholders have been identified. Furthermore it can be stated that almost all studies concentrate on 'formal' forms of training, although it is informal training which is rapidly growing within firms.

Within this latter issue is the problem of identifying what the original goals of the training were in order to establish a reliable return indicator. Many of the studies have linked the incidence of training to a certain return indicator which may be inappropriate: while it may show that the training had a positive 'effect', it may neglect the issue of whether the type and form of training was an 'effective' way to meet specific goals. Identifying appropriate return indicators is also complicated by the fact that there are tangible and intangible returns to training.

In addition, it seems that various actors have different criteria for returns and evaluate those returns in a different way; for example, while an employee might see training as being transferable, an employer might see the same training as likely to generate a spillover effect. This creates a number of problems in assessing the returns with respect to the way in which the benefits are appropriated.

A final conclusion can be drawn in that the findings of the existing studies in this area are very hard to compare with each other due to the diverse nature of the work. Some of them are conducted within firms, while others are conducted across firms; some are conducted by enterprise staff-members, others by universities or research institutes with rather different points of view on training. Furthermore, some of the studies are of a purely qualitative character; others encompass qualitative and quantitative research, considering more intangible and/or subjective aspects within big-scale surveys, be it cross-sectional and/or longitudinal on a cohort-basis.

It is somewhat utopian to think that a single definitive number can be produced regarding the returns to continuing training within enterprises for the different stakeholders, although this does not undermine the need for further work. As Kirkpatrick states: "Be satisfied with evidence if proof is not possible" (Kirkpatrick, 1994, p. 68). The work reviewed does indicate what might be achieved, at least from the enterprise perspective. For example, the work that shows higher benefits flowing from training when it is used in conjunction with other human resource policies (Ichniowski et al. 1995) provides an insight of practical use. In thinking about what might be done next, we can usefully ask the question, what would business/policy-makers/individuals like to know that (a) we currently do not know and (b) we might, as researchers, be able to answer using existing techniques.

From the discussion in Section 3, there are certain issues which need to be considered in formulating further work in measuring the returns to enterprise CVT, these include:

(i) The effects of training which can be viewed as occurring in an immediate fashion, such as through participant's reactions, or in a more distant way, such as through changed behaviour or increased productivity. The issue has to be addressed of

what level of evaluation is most useful, given the very different reasons for which enterprises implement training, and whether level 4 evaluation should be supplemented in a way that provides a greater insight into the training process and its effectiveness, as well as the end results.

(ii) The different types and forms of training (formal/informal, specific/general, etc.), especially given that the boundaries of work and learning might be blurring. Some of the studies reviewed in Section 2 indicate that work is progressing in this area: e.g. the findings of both Black and Lynch (1996) and Barrett and O'Connell (1998) show that productivity is affected differently according to the type of training pursued, rather than the overall provision of training per se.

(iii) The types of returns and how these relate to training objectives or other more general objectives. Within this is a need to generate measures of intangible as well as tangible returns; for example, for individuals we have noted that increased job satisfaction may be more important than the wage effects of training. It is therefore important to generate measures of these types of intangible returns.

(iv) The training beneficiaries - individuals/firms/sector/state - and the way in which the benefits are appropriated between the stakeholders. We know from the discussion above that work is particularly underdeveloped concerning the state, for example. Inherent to the appropriation of benefits is the perspective from which returns are measured, given that the different stakeholders may have different criteria for what constitutes a return, for example, training transferability from the individual perspective versus the 'spillover' effect for enterprises. On the other hand, for certain returns there may be agreement as to what constitutes a mutual benefit.

(v) The different methodologies and research disciplines (qualitative/quantitative, economic/sociological, etc.). Inherent to this point is the availability of data from enterprises or the ability to generate the necessary data.

Whether some of these issues should be addressed independently - as subsidiary questions to the overall issue of evaluating work on the returns to continuing training in enterprises - or treated within a comprehensive framework is partly dependent on how work should progress. To a large extent, there is a trade-off concerning what can be achieved in the short and the long term.

4.2 Further work

In the short term, a number of benefits could be gained by investigating certain subsidiary questions. Some of these have been addressed in the studies discussed above, but the work remains fragmentary and could be supplemented. Among the questions which could be addressed are the following:

- Why do enterprises implement training?
- What types of training are most useful and for whom? For example, should companies bother providing training of a general nature, or should they restrict their efforts to training that is specific to their needs?
- How does the effectiveness of training depend on the implementation of other human resource strategies?
- Does the provision of training have an impact on productivity through its effect on other variables? For example, do workers who receive training remain with the firm for longer periods?
- Reversing the above item, are trained workers more likely to leave? In particular, is the theoretical prediction that workers who receive general training are more likely to leave seen in real life? And if such workers do leave, what does this imply about the returns to training provision for the firm?
- Does training received elsewhere raise productivity on the current job?

In addition, as a general recommendation, more thought should be given to methodological issues, for example, the suitability of qualitative and quantitative research and whether they can be used in a complementary way, the definitions of training and 'returns' and other such issues, which are important in designing research.

In the longer term, a more coherent approach could be developed alongside other advancements in evaluating enterprise training investment, such as Human Resource Accounting. In addition, the development of a more comprehensive stakeholder-based approach and combining expertise from a number of different disciplines and research methodologies could advance future work.

One example of such a project could be a collaborative exercise on CVT evaluation between the research and business communities. Given that there is a lack of formal evaluation of training undertaken at enterprise level, this clearly could yield mutual benefits for both groups. To be effective, such a collaborative exercise would commence with research design and would continue through data collection, analysis and presentation. Researchers could assist companies by identifying the information which they should be gathering and subsequently using to evaluate CVT investments. To be successful, the research/business partnership would need to exist over a period of time and not just when the researchers arrive to conduct a one-off interview. Ideally, the researchers' involvement in the training evaluation should begin before a training investment is undertaken. In this way, the researcher can contribute to the establishment of baseline indicators such as output per worker, amongst others. Once the training is completed, the baseline indicators could then be used to provide some insights into the returns to the training investment. In this way, the analytical talents and academic interests of the researchers are combined with the information needs of the enterprise.

The objective of this review has been to outline the issues involved in measuring the benefits of employer-provided training and to stimulate thought and discussion on how research in this area might proceed. It is clear that there are many difficulties in approaching this topic and so there may be a reluctance to confront the issues. However, we would argue that advances in our knowledge in this area are crucial if optimal resource allocations are to be made in the area of training and human capital development generally.

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Exploring the returns to continuing vocational training in enterprises

A review of research within and outside of the European Union

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Exploring the returns to continuing vocational training in enterprises

A review of research within and outside of the European Union

Summary

Inherent in the notion of lifelong learning is that enterprises should increase investment in continuing vocational training. The general lack of information, however, as to the returns of such training for the State, sectors, enterprises, and individuals means that there are a number of difficulties in evaluating current and future investment decisions. This review presents research which has attempted to estimate the returns of employer-provided training, discusses the conceptual and methodological issues which exist in this context, and suggests ways in which research in this area can be usefully expanded. This report represents the first stage in formulating a CEDEFOP project in this area.

Dr Alan Barrett, Prof Dr Ben Hövels

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